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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,725	09/10/2003	Momtaz N. Mansour	TCI-3	3878
22827 7590 04/02/2007 DORITY & MANNING, P.A. POST OFFICE BOX 1449 GREENVILLE, SC 29602-1449			EXAMINER PATEL, VINI T H	
			ART UNIT 1764	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
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Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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Office Action Summary	Application No. 10/659,725	Applicant(s) MANSOUR ET AL.	
	Examiner Vinit H. Patel	Art Unit 1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-93 is/are pending in the application.
- 4a) Of the above claim(s) 46-93 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23, 25-38 and 41-44 is/are rejected.
- 7) ☒ Claim(s) 24, 39, 40 and 45 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>16Aug04</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Group I, claims 1-45, in the reply filed on January 3, 2007 is acknowledged.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 19-22 and 25-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Monacelli et al., USP 5752994.

Regarding the following claims:

19. Monacelli discloses a process for producing a product gas having heat or fuel value (abstract) comprising: feeding a carbonaceous material to a first fluidized bed 54, the first fluidized bed containing particles suspended in a fluid medium (C6/L1-5); indirectly heating the first fluidized bed with a combustion device (C6/L14-20; C7/L25-30), the first fluidized bed 54 being heated to a temperature of less than about 1200 degrees F. (C6/L21-24), at least a portion of the carbonaceous material being gasified to form a first product gas stream (C6/L46-59); extracting bed solids containing carbon from the first fluidized bed and feeding the extracted solids to a second fluidized bed (recirculation, C6/L40-45), the second fluidized bed being at a temperature higher than the temperature of the first fluidized bed (C6/L30-39), the second fluidized bed having a fluidizing medium comprising steam and an oxygen-containing gas (C6/L7-20), wherein at least a portion of the carbon contained in the extracted bed solids is gasified to form a second product gas stream (C6/L3039).

20. Monacelli discloses a process as defined in claim 19, wherein the first fluidized bed is maintained at a temperature of less than about 1150 degrees F (C6/L20-25).

21. Monacelli discloses a process as defined in claim 19, wherein the carbonaceous material comprises black liquor (C4/L13).

22. Monacelli discloses a process as defined in claim 19, wherein the first product gas stream is fed to a filtering device for filtering solids entrained in the product gas stream, the filtered solids being recirculated back to the first fluidized bed (C6/L40-45).

25. Monacelli discloses a process as defined in claim 19, wherein the portion of the carbonaceous material gasified in the first fluidized bed is endothermically converted to a gas (C3/L63-67).

26. Monacelli discloses a process as defined in claim 19, wherein the fluidized bed particles contained in the first fluidized bed and the second fluidized bed comprise sodium carbonate (C1/L49-57).

27. Monacelli discloses a process as defined in claim 19, wherein the second fluidized bed is heated by oxidizing carbon in the bed (C6/L21-45).

28. A process as defined in claim 19, wherein the second product gas stream is filtered in order to remove entrained solids (C6/L40-46).

29. Monacelli discloses a process as defined in claim 19, wherein bed solids are periodically extracted from the second fluidized bed (C6/L30-45).

30. Monacelli discloses a process as defined in claim 29, wherein the re-

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circulated bed solids are mixed with the carbonaceous material being injected into the first fluidized bed (C6/L40-45).

31. Monacelli discloses a process as defined in claim 19, wherein the first product gas stream is combined with the second product gas stream (C6/L8-51, disclosing that product gases are circulated between upper and lower beds, therefore combining the product gas streams).

Claims 33-37 and 41-44 are rejected under 35 U.S.C. 102(b) as being anticipated by Mansour et al., USP 5306481.

Regarding the following claims:

33. Mansour discloses a process for producing a product gas having heat or fuel value comprising (C5/L1-30): feeding a carbonaceous material to a fluidized bed (C6/L45), the fluidized bed containing particles suspended in a fluid medium (C6/L46), the fluidized bed including a top portion and a bottom portion, the bottom portion being in communication with a solids collection reservoir (Fig. 1); indirectly heating the fluidized bed with a combustion device (C5/L55), the fluidized bed being heated to a temperature of less than about 1200 degrees F. (C7/L67), a portion of the carbonaceous material fed to the fluidized bed being gasified to form a product gas stream (C7/L50-63); and feeding a gaseous medium through the solids collection reservoir (C11/L1-30), the gaseous medium comprising an oxygen-containing gas (C11/L1-30), the gaseous medium gasifying carbon particles that have accumulated in the bottom portion of the fluidized bed (C11/L1-30).

34. Mansour discloses a process as defined in claim 33, wherein the fluid

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medium in the fluidized bed comprises steam (C12/L6-20).

35. Mansour discloses a process as defined in claim 33, wherein the fluidized bed is heated to a temperature of less than about 1150 degrees F (C17/L54-59).

36. Mansour discloses a process as defined in claim 33, wherein the fluidized bed is heated to a temperature of less than about 1100 degrees F (C23/L25).

37. Mansour discloses a as defined in claim 33, wherein the product gas stream is fed to a filtering device for filtering solids entrained in the product gas stream, the filtered solids being recirculated back to the fluidized bed (C19/L64-C20/L5).

41. Mansour discloses a process as defined in claim 33, wherein the carbonaceous material comprises a black liquor (C17/L29).

42. Mansour discloses a process as defined in claim 34, wherein at least a portion of the carbonaceous material fed to the fluidized bed is steam reformed to form the product gas stream (C1/L9-15).

43. Mansour discloses a process as defined in claim 41, wherein the particles suspended in the fluidized bed comprise sodium carbonate (C17/L51).

44. Mansour discloses a defined in claim 33, wherein the combustion device that indirectly heats the fluidized bed comprises a pulse combustion device (C17/34).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 4-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mansour et al., USP 5306481 in view of Mullen, EP0641884A1.

Regarding the following claims:

1. Mansour discloses a process for converting carbonaceous material into a product gas comprising (C5/L21-30): indirectly heating a fluidized bed (C6/L58-C7/L5), the fluidized bed containing particles suspended in a fluid medium (C11/L59-C12/L20); injecting the dried carbonaceous material into the fluidized bed (C12/L27-35); and endothermically converting at least a portion of the carbonaceous material into a product gas stream (C6/L45-50), and drying a carbonaceous fluid to form a carbonaceous material having a solids content (C7/L50- 52), but not explicitly drying a carbonaceous fluid to form a carbonaceous material having a solids content of at least 80%.

Mullen discloses a method wherein higher solid concentrations of 80% are attained (P4/L5-15), and it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Mansour with Mullen for the purpose to provide efficient and increased throughput operation with high solids feeds having higher heat value (P4/L5-15, Abstract).

4. Mansour discloses a process as defined in claim 1, wherein the carbonaceous fluid comprises black liquor (C12/L1-5).

5. Mansour discloses a process as defined in claim 1, wherein the fluidized bed is indirectly heated by at least one pulse combustion device, the pulse combustion device creating a pulsating combustion stream and an acoustic pressure wave that are

transmitted through at least one resonance tube inserted into the fluidized bed (C6/L45-C7/L5).

6. Mansour discloses a process as defined in claim 1, wherein the fluidized bed is maintained at a temperature of from about 1100 degrees F. to about 1300 degrees F (C7/L64-65) as overlap of ranges indicates a prima facie case obviousness. See MPEP 2144.

7. Mansour discloses a process as defined in claim 1, wherein the fluidized bed is maintained at a temperature of less than about 1150 degrees F (C7/L67) as overlap of ranges indicates a prima facie case obviousness. See MPEP 2144.

8. Mansour discloses a process as defined in claim 1, wherein the fluidized bed is at a temperature and the dried carbonaceous material has an average particle size, a particle size distribution and a solids concentration such that the carbonaceous material forms a molten layer on the fluidized bed particles prior to being converted into a gas

9. Mansour discloses a process as defined in claim 1, wherein the carbonaceous material is injected into the fluidized bed in a carrier gas (C7/L34-37).

10. Mansour discloses a process as defined in claim 9, wherein the carrier gas comprises steam (C7/L34-37).

11. Mansour discloses a process as defined in claim 9, wherein the carrier gas comprises at least a portion of the product gas stream (C8/L48-56).

12. Mansour discloses a process as defined in claim 1, wherein the carbonaceous material is injected into the fluidized bed so as to have an average particle size of from about 45 microns to about 120 microns (C12/L1-5) as overlap of

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ranges indicates a prima facie case obviousness. See MPEP 2144.

13. Mansour discloses a process as defined in claim 4, wherein the fluidized bed particles comprise sodium carbonate (C17/L48-55).

14. Mansour discloses a process as defined in claim 1, wherein the product gas is filtered to remove entrained solids (C10/L61-66).

15. Mansour discloses a process as defined in claim 1, wherein the product gas is fed through a scrubbing device for removing sulfur compounds contained within the gas (C8/L6-19).

16. Mansour discloses a process as defined in claim 1, wherein the carbonaceous material is dried in a second fluidized bed (C9/L59-11).

17. Mullen discloses a process as defined in claim 16, wherein the carbonaceous material is fed to an evaporator prior to entering the second fluidized bed (P4/L5-15; Fig. 2).

18. Mansour discloses a process as defined in claim 1, wherein the carbonaceous material is endothermically converted in the fluidized bed in a manner such that substantially no slag is formed (C5/L13).

Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mansour et al., USP 5306481 in view of Mullen, EP0641884A1 and Feldmann, USP 4522685.

Regarding the following claims:

2 and 3. Mansour in view of Mullen disclose all of the limitations of the process as defined in claim 1, but does not explicitly disclose wherein the dried carbonaceous

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material has a solids content of at least about 90% or at least about 95%. Felmann discloses it is desirable to concentrate solids in black liquor up to 100% (C3/L44-55), Mansour and Mullen with Feldmann for the purpose to provide efficient and increased throughput operation with high solids feeds having higher heat value (P4/L5-15, Abstract).

Claims 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Monacelli et al., USP 5752994 in view of Tanca, USP 5624470.

Regarding the following claim:

23. Monacelli discloses all of the limitations of the process as defined in claim 19, and wherein the fluidizing medium fed to the second fluidized bed contains oxygen (C6/L52-60), but does not explicitly in a stoichiometric amount of less than about 50% based on the amount of carbon in the bed. Tanca discloses black liquor gasification carried out with oxygen in the range of 20-50% to result in gasification of more than 60-99% (C2/L26-45), and it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Monacelli to carry out the gasification reaction at stoichiometric amount of less than about 50% based on the amount of carbon in the bed for the desired resulting gasification products as such a modification is a result effective variable, where one skilled in the art would recognize to optimize a process variable by routine experimentation, for example in this case, control the results of the gas produced (Tanca, C2/L25-45). See In re Boesch, 617 F.2d 272, 276 (CCPA 1980); MPEP 2144.05.

Claims 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Monacelli et al., USP 5752994 in view of Mansour et al., USP 5306481.

Regarding the following claim:

32. Monacelli discloses all of the limitations of the process as defined in claim 19, but does not disclose wherein the combustion device that indirectly heats the first fluidized bed comprises a pulse combustion device. Mansour discloses black liquor gasification process utilizing a pulse combustor to indirectly heat the first fluidized bed, and it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Monacelli with Mansour for the purpose to provide enhanced reaction rates in the fluidized bed resulting from heat transfer (C4/L48-57).

Claims 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mansour et al., USP 5306481, in view of Tanca, USP 5624470.

Regarding the following claim:

38. Mansour discloses all of the limitations of the process as defined in claim 33, but does not wherein the gaseous medium fed through the solids collection reservoir contains oxygen in a stoichiometric amount less than about 50%. Tanca discloses black liquor gasification carried out with oxygen in the range of 20-50% to result in gasification of more than 60-99% (C2/L26-45), and it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Mansour to carry out the gasification reaction at stoichiometric amount of less than about 50% based on the amount of carbon in the bed for the desired resulting gasification products as such a modification is a result effective variable, where one skilled in the art would recognize to optimize a

process variable by routine experimentation, for example in this case, control the results of the gas produced (Tanca, C2/L25-45). See In re Boesch, 617 F.2d 272, 276 (CCPA 1980); MPEP 2144.05.

Allowable Subject Matter

Claims 24, 39, 40 and 45 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art cited, either alone or in combination, among other elements, discloses processes for converting black liquor into product gasses utilizing fluidized beds indirectly heated by pulse combustors with steam as the fluidizing bed medium and sodium carbonate as bed solids. However, the prior art alone or in combination does not disclose or suggest such processes wherein a portion of the carbon contained in the extracted bed solids is oxidized in the second fluidized bed, while another portion of the solids contained in the extracted bed solids is endothermically converted to a gas in the second fluidized bed or wherein a portion of the carbon particles contained in the solids collection reservoir are oxidized and wherein another portion of the carbon particles contained within the solids collection reservoir are endothermically converted to a gas or wherein the particles suspended in the fluidized bed comprise sodium carbonate and the fluidizing medium comprises steam, the carbonaceous material being fed to the fluidized bed comprising black liquor, a majority of the black liquor being steam reformed in the fluidized bed, and wherein a portion of the carbon particles that

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have accumulated in the bottom portion of the fluidized bed are oxidized, while another portion of the carbon particles are steam reformed or wherein the solids collection reservoir is maintained at a higher temperature than the fluidized bed.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vinit H. Patel whose telephone number is (571) 272-0856. The examiner can normally be reached on 9:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

vhp

Supervisory


GLENN A. CALDAROLA
PRIMARY EXAMINER
GROUP 1100

TC1700